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EXAMINER	
STAPLES, MARK	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/776,711	SHAH, MRUGESH	
	Examiner	Art Unit	
	Mark Staples	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/01/2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,9 and 11-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,9 and 11-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment of claims 1, 3, 9, 11-13, and 16 in the paper filed on 10/01/2007 is acknowledged. Claims 2, 4-8, and 10 were canceled in the paper filed on 11/30/2006.

Claims 1, 3, 9, and 11-16 are pending and at issue.

Applicant's arguments filed on 10/01/2007 have been fully considered and are deemed to be persuasive to overcome some of the rejections previously applied. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Objections and Rejections that are Withdrawn

2. The abstract to the title is withdrawn in light of Applicant's amendment of the abstract. However, the amended abstract contains a minor error and is objected to, please see below.

Claim Objections Withdrawn

3. The objections to claim 3 are withdrawn in light of Applicant's amendments to this claim which overcome the objections.

4. The objection to claim 12 is withdrawn in light of Applicant's amendment to this claim which overcomes the objection.

Claim Rejections Withdrawn - 35 USC § 112 Second Paragraph

The claim rejections designated III. D. through III.I. by Applicant are withdrawn.

5. The rejection of claims 1, 9, and 11 under 35 U.S.C. 112, second paragraph for use of the terms "coal' and "petroleum" in a manner contrary to their accepted definitions is withdrawn. Applicant has amended the claims to recite "synthetic coal" and "synthetic petroleum".

The rejection of claims 1, 3, and 9 under 35 U.S.C. 112, second paragraph, as being indefinite for recitation of "converting of solid fuels, including coal . . . by distillation of coal . . ." is withdrawn. Applicant has overcome this rejection through amendment to the claims.

The rejection of claim 12 for insufficient antecedent basis of "the production environment" is withdrawn. Applicant has overcome this rejection through amendment to the claim.

The rejection of claim 12 for insufficient antecedent basis of "nutrient" is withdrawn. Applicant has overcome this rejection through amendment to the claim.

The rejection of claim 12 as indefinite for reciting "more production per unit nutrient or starting fossil fuel or oil tar" is withdrawn. Applicant has overcome this rejection through amendment to the claim.

The rejection of claims 1, 9, and 11 for reciting "including" is withdrawn. Applicant has overcome this rejection by deleting "including".

The rejection of claim 13 as indefinite for reciting the terms "rocky", "sandy", "sand/water", "heat", and "cold" is withdrawn. Applicant has overcome this rejection through amendment to the claim.

Claim Rejections Withdrawn - 35 USC § 102

6. The rejection of claims 11-13 under 35 U.S.C. 102(b) as being anticipated by Choi et al. (1998) is withdrawn. Applicant's arguments are persuasive.

Claim Rejections Withdrawn - 35 USC § 103

7. Claims 1, 3, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurashov et al. (Patent No. RU 2,180,919 published in 2001, translated into English by the USPTO in December 2006) and Carroll et al. (1993) is withdrawn. Applicant's arguments are persuasive.

Rejections that are Maintained

8. The objection to the title is maintained. Although Applicant has amended the title, this amendment does not indicate the claimed invention of methods, but rather is directed to products. Appropriate correction is required.

Claim Rejections Maintained - 35 USC § 112 Second Paragraph

The claim rejections designated III. A. through III.D. by Applicant are maintained.

9. The rejection of claims 1 and 3 as still being incomplete is maintained. While Applicant has provided an active step through amendment of combining the microorganism with solid fossil fuels or oil tars, that active step is still incomplete. Claims 1 and 3 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: what conditions are suitable for conversion of the solid fuels or oil tars into synthetic petroleum. A search of the specification by Examiner did not reveal where "conditions suitable for conversion" are given.

The rejection of claim 9 as still being incomplete is maintained. While Applicant has provided an active step through amendment of combining the microorganism with solid fossil fuels or oil tars, that active step is still incomplete. Claim 9 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: what conditions are suitable for conversion of the solid fuels or oil tars into synthetic petroleum. A search of the specification by Examiner did not reveal where "conditions suitable for conversion" are given.

The rejection of claims 11-15 as still being incomplete is maintained. While Applicant has provided an active step through amendment of combining the microorganism with solid fossil fuels or oil tars, that active step is still incomplete. Claims 11-15 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the

elements. See MPEP § 2172.01. The omitted elements are: what conditions are suitable for conversion of the solid fuels or oil tars into synthetic coal or synthetic petroleum. A search of the specification by Examiner did not reveal where "conditions suitable for conversion" are given.

Lack of Enablement Maintained

10. Claims 1, 3, 9, and 11-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. This rejection has been augmented due to amendment of the claims to recite "synthetic coal" and "synthetic petroleum".

Applicant's arguments filed 10/05/2007 have been fully considered but they are not persuasive.

The nature of the invention and breadth of claims

The breadth of the claims has expanded by amendment, and has not been narrowed as Applicant argues. Applicant argues that the amended claims now recite synthetic coal or synthetic petroleum rather than coal and petroleum which occur naturally and that this amendment also enables the breadth of the claims. Examiner disagrees. Claims 1, 3, 9, and 11-16 are still broadly drawn to methods of producing mixtures resembling coal and petroleum. The recitation of "synthetic" does not limit the breadth of the claims as every naturally occurring component of coal and petroleum,

which includes those yet to be discovered, can potentially have a synthetic counterpart and be a part of the claimed mixtures.

Thus the claimed invention at a minimum recites all of the components found in coal and petroleum. Recitation of "synthetic" broadens the claims, since the claims now read, on not only the natural components and thei synthetic counterparts, but on myriads of synthetic components which may resemble natural components in composition and or function but which are not the exact composition and or function as found in the natural components of coal and petroleum. In other words claims 1, 3, 9, and 11-16 in reciting "synthetic" more broadly recite more mixtures than just mixtures which contain the exact same counterpart components found in coal and petroleum.

The unpredictability of the art and the state of the prior art

Applicant first argues that Zaldivar et al. teach industrial configuration for ethanol production which is an old and well-developed technology. However, this old technology which is ethanol production from starting materials of sugar cane juice and cornstarch serves as comparison and backdrop for difficulties encountered in the new art of ethanol production from starting materials of the instant claimed invention, such as wheat straw (a type of grass or turf), corn stalks (a type of grass or turf), and forestry residues (a type of wood), see 2nd paragraph under Introduction on p. 17. The instant claimed invention is to production of synthetic coal and synthetic petroleum, not from sugar cane juice and cornstarch, but obtained from turf, grass, wood, and other starting materials. Zaldivar et al. teaches that such new methods of production are difficult compared to the old methods of production. Thus Zaldivar et al. are correctly relied upon for teaching the unpredictability of state of the art which the claimed invention is directed to.

It is noted that Applicant does not address the teachings of Jeffries et al. and thus these teachings are uncontested.

Applicant makes a cursory dismissal of the teachings of Lin et al. However, as with Zaldivar et al., Applicant is misinterpreting Lin et al. Lin et al. also teach that the old technology of ethanol production from starting materials of glucose and sucrose serves as comparison and backdrop for difficulties encountered in the new art of ethanol production from starting materials of the instant claimed invention, such as wheat or rice straw (types of grass), forestry, and paper mill discards, the paper portion (types of wood), see 3rd paragraph under Introduction on p. 627. The instant claimed invention is to production of synthetic coal and synthetic petroleum, not from glucose and sucrose, but from turf, grass, wood, and other starting materials. As with Zaldivar et al., Lin et al. teaches that such new methods of production are difficult compared to the old methods of production. Thus Lin et al. are correctly relied upon for teaching the unpredictability of state of the art which the claimed invention is directed to.

Applicant then argues that Zaldivar et al. teach industrial configurations. However Zaldivar do not solely teach industrial configurations but more generally teach "Fuel ethanol production from lignocellulose . . . (see Title). The instant claims are directed towards fuel production as well, that is production of synthetic petroleum, a fuel. Instant claim 9 specifically recites: "A method of improving conversion of (i) solid fuels or (ii) oil tars . . . into synthetic petroleum comprising the steps of . . . (g) determining whether productivity is improved". In other words both Zaldivar et al. and the instant claims are directed to improving productivity. Thus Zaldivar et al. is also correctly relied upon for teaching the difficulties of improving productivity of synthetic petroleum production.

Unpredictability of Gene Transfection

Zaldivar et al. further teach genetic changes, including the transfection of the claimed invention are difficult to predict: ". . . the cell is a complex network of regulatory mechanisms, just partially elucidated, which makes it difficult to predict the consequences of the genetic changes introduced" (see page 27, 2nd column, 1st full paragraph, 4th sentence).

Unpredictability of Conversion of Solid Fossil Fuels and Oil Tars

Hamme et al. (2003) confirms the unpredictability of aerobic conversion of hydrocarbons (as found in fossil fules and oil tars) by microorganisms and the lack of knowledge of the genes involved in anaerobic conversion. Aerobic conversion is but one of the many types of conversion recited in the instant. See the section *Metabolism* beginning on p. 505. Some key excerpts are given:

> "Microorganisms are equipped with metabolic machinery to use petroleum as a carbon and energy source. The fundamental aspects of n-alkane metabolism and the genes involved have been known for some time. While significant gains have been made in our understanding of the processes involved, the specifics of individual systems and the diversity of systems are yet to be fully described" (1st sentence under this section).

Hamme et al. (2003) also confirms the unpredictability of anaerobic conversion:

> "The diversity and unique properties of the anaerobic hydrocarbon-

utilizing bacteria are areas that are in need of more work. While difficult, greater focus on isolating and characterizing the enzymes involved in anaerobic hydrocarbon metabolism is required. Futhermore, uptake, efflux, and chemotaxis, areas only recently explored for aerobes, are topics so far untouched in the anaerobic realm. A balanced shift from molecular biology back to enzymology and protein biochemistry is a move that would benefit the understanding of hydrocarbon metabolism in all areas" (see 1st paragraph of 2nd column on p. 514).

Unpredictability of Isolating Genes Responsible for Conversion

Hamme et al. (2003) also confirm the unpredictability of identifying genes for subsequent isolation for aerobic alkane metabolism, which is conversion of just one component found in fossil fuels and oil tars. Some key excerpts are given below.

"As other strains are characterized, it appears that the clustering and regulation of alkane degradation genes varies among the bacteria" (1st sentence of 1st paragraph on p. 505).

"Despite the importance of alkane degradation systems, little information is available for pathways other than the aerobic

monooxygenase-mediated pathway found on the OCT plasmid" (1st sentence of 3rd paragraph on p. 506).

"In the above cases, there is much work to be done with respect to describing both the genetic systems and the enzymes involved. Even more challenging will be answering questions such as . . .
how the different approaches to alkane metabolism evolve and how are they related, and how well-characterized and novel metabolic pathways can be applied in fine-chemical synthesis" (see 2nd paragraph of 2nd column on p. 506).

"How these various metabolic routes are controlled at the genetic level and how they compete for a substrate is still a major question" (last sentence in 1st column on p. 512).

Identifying genes with probes as generally disclosed in the specification is "Limited to known genes, activity cannot be inferred from presence of genes alone" (see Table 3, especially the last two entries).

Unpredictability of Producing Synthetic Coals and or Synthetic Petroleum from Transfected Organisms

As the foregoing references convey, the state of the art is unpredictable in obtaining singular products from transfected microorganisms. The state of the art is then far more unpredictable in producing the complex mixtures of synthetic coal and or synthetic petroleum from transfected microorganisms.

Quantity of Experimentation

Applicant argues that Zaldivar et al. is limited to industrial production but this is not so as noted directly above. The extremely large quantity of experimentation necessary to arrive at Applicant's claimed invention is supported by the teachings of Zaldivar et al., Lin et al., Jeffries et al., and Hamme et al. who each teach the difficulties of making just one synthetic component of coal or petroleum whereas the claimed invention is for methods of making mixtures of components, i.e. synthetic coal and synthetic petroleum.

Working Examples

Applicant is correct that working examples are not mandatory. However, the absence of working examples in the instant application further supports the lack of enablement of the instant claimed invention. Furthermore, Examiner does not find that the argued prophetic example of Thiobacillus aquaesulis 4255 and 389, Thiosphaera pantotropha 356, Thiosphaera pantotropha 2944, and Thoibacillus thoioparus 55, or mutations or variant strains as previously disclosed in WO 0246466 enables the claims.

The specification does not provide the guidance to carry out this argued prophetic example.

Guidance in the Specification.

Applicant again refers to the Prophetic Example in the specification. Yet there is no guidance in the Prophetic Example nor in the entire specification identifying a single gene responsible for conversion ability much less a representative number of genes nor a single mixture which is a synthetic coal or synthetic petroleum, much less a representative number of the vast numbers of such mixtures, which are claimed.

Applicant is correct that the recombinant *E.coli* results are found in Table 3 of Ishizaki et al. Applicant is also correct that this table show superior as well as inferior results of a recombinant *E coli.* selected by Choi et al. through elaborate procedures. And this is the point, simply transfecting genes does not guarantee a transfected cell which yields a product, much less one which is productive in yielding that product. This is taught Choi et al. as noted in the Office Action. These teachings of Lin et al. and Choi et al. demonstrate the need for detailed procedures in order to obtain a successfully transfected microorganism, and even further detailed procedure in order for that microorganism to be productive. And this essential detail is for just one microorganism, *E coli* and one component P(3HB) and not for the claimed multitude of microorganisms and mixtures of components, such as synthetic petroleum. The instant specification is silent on such essential detail.

Examiner disagrees that the comparison of productivities between microorganisms is not relevant to the method of claim 9. As noted above, the scope of

claim 9 encompasses productivity by specifically reciting ". . . determining whether productivity improved". It is also noted that this recitation does not exclude "industrial" productivity. The teachings of Choi et al. on comparison of productivities are relevant to the instant claims.

Applicant over interprets Examiner's mention of the "likely" use of enzymes as evidence that the specification provides adequate guidance to carry out the claimed invention. Speculation by Examiner in using the word "likely" is not considered to be an indication of inherent guidance in the instant specification.

Lack of Guidance for Gene Transfection

The instant specification provides no essential detail on how to accomplish the difficult type of gene transfection claimed. No transfected microorganism is given in the specification.. One of skill in the art would not know how to accomplish the requisite gene transfection to use the claimed invention.

Lack of Guidance for Gene Identification and Isolation

The instant specification provides no essential detail on how to identify and isolate the unknown gene(s) required for the claimed invention. No gene for transfection is identified in the specification. One of skill in the art would not know how to identify and isolate the requisite genes to use the claimed invention.

Lack of Guidance for Suitable Conversion Conditions

The instant specification provides no essential detail on how to determine the requisite and suitable conditions for conversion of starting materials. No set of suitable

conditions is given in the specification for conversion of starting materials. One of skill in the art would not know what conditions would be suitable for conversion of starting materials.

Lack of Guidance for Obtaining Synthetic Coal and or Synthetic Petroleum

The instant specification provides no essential detail on how to obtain the complex mixtures of synthetic coal and or synthetic petroleum using transfected organisms. No complex mixtures of synthetic coal and or synthetic petroeleum are given in the specification. One of skill in the art would not know how to obtain synthetic coal and or synthetic petroleum using transfected organisms.

Level of Skill in the Art

Applicant concurs that the level of skill in the art is deemed to be high.

Conclusion

Analysis using the Wands factors supports the non-enablement of the newly claimed invention. There at least four areas of critical subject matter where the application is not enabled: (1) transfecting the host genes so as to result in conversion of the starting materials by the transfected microorganism, (2) isolating the genes responsible for the conversion ability from the host microorganism, (3) providing conditions for suitable conversion by the transfected microorganism, and (4) obtaining the complex mixtures of synthetic coal and or synthetic petroleum from the conversion by the transfected microorganism. As the claims contain this subject matter which was not described in the specification in such a way as to enable one skilled in the art to

which it pertains, or with which it is most nearly connected, to make and/or use the invention, the claims are not enabled.

New Objections and Rejections Necessitated by Amendment

11. The amended Abstract is objected to, as the period following the word "viability" in line 4 needs to be deleted. Appropriate correction is required.

New Claim Rejections - 35 USC § 112, Second Paragraph

12. Claims 1, 3, 9, and 11-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

13. The term "synthetic" in claims 1, 9, 11, 12, and 16 is a relative term which renders the claim indefinite. The term "synthetic" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "synthetic" renders the product of synthetic petroleum indefinite. Dependent claims 3 and 13-15 are likewise indefinite.

14. The term "synthetic" in claim 11, 12, and 16 is a relative term which renders the claim indefinite. The term "synthetic" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term

"synthetic" renders the product of synthetic coal indefinite. Dependent claims 13-15 are likewise indefinite.

New Claim Rejections - 35 USC § 112 First Paragraph

New Matter

15. Claims 1, 3, 9, and 11-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The amended claims recite "synthetic coal" and "synthetic petroleum". There is no basis for these terms in the originally filed application and thus these terms constitute new matter.

16. The scope of the claims has changed due to the newly recited methods of converting starting materials into "synthetic petroleum" and "synthetic coal". The change in scope required further consideration and search which necessitated new rejections.

Claim Interpretation

17. As Applicant has not defined the terms "synthetic coal" and "synthetic petroleum", they are reasonably interpreted as follows. "Synthetic coal" is reasonably interpreted as as any mixture of materials and or molecules which are found in coal but synthetically

produced to be a replica of or resemble coal; and any mixture of materials and or molecules which replaces or is used instead of coal. Likewise, "synthetic petroleum" is reasonably interpreted as any mixture of materials and or molecules which are found in petroleum but synthetically produced to be a replica of or resemble petroleum; and any mixture of materials or molecules which replaces or is used instead of petroleum.

Conclusion

18. No claim is allowed.

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Staples whose telephone number is (571) 272-9053. The examiner can normally be reached on Monday through Thursday, 9:00 a.m. to 6:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mark Staples
Examiner
Art Unit 1637
December 6, 2007

KENNETH R. HORLICK, PH.D
PRIMARY EXAMINER

12/10/07